

**BAHAN KECEMERLANGAN (BK1) 2016**  
**4541/3 KIMIA**  
**KERTAS 3**

Question	Rubric	Score
1 (a)(i)	Able to state the observation correctly.  <u>Sample answer:</u> Yellow solid changed to grey solid.	3
	Able to state any observation less accurately.  <u>Sample answer:</u> Grey solid formed // Yellow solid changed	2
	Able to give an idea of observation.  <u>Sample answer:</u> Lead oxide changed to lead // Lead is formed.	1
	No response given / wrong response	0

Question	Rubric	Score
1 (a)(ii)	Able to give the inference correctly.  <u>Sample answer:</u> Lead oxide changed to lead // Lead oxide is reduced to lead.	3
	Able to give inference less accurately.  <u>Sample answer:</u> Metal oxide changed to metal // Lead is formed	2
	Able to give an idea of inference.  <u>Sample answer:</u> Lead oxide changes.	1
	No response given / wrong response	0

Question	Rubric	Score												
1(b)	<p>Able to complete the table and record the mass correctly containing:</p> <ol style="list-style-type: none"> <li>1. Correct description</li> <li>2. Readings (2 decimal places)</li> </ol> <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th>Step</th> <th>Description</th> <th>Mass (g)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Combustion tube + asbestos paper</td> <td>64.00</td> </tr> <tr> <td>2</td> <td>Combustion tube + asbestos paper + lead oxide/yellow solid</td> <td>117.52</td> </tr> <tr> <td>3</td> <td>Combustion tube + asbestos paper + lead/ grey solid</td> <td>113.68</td> </tr> </tbody> </table>	Step	Description	Mass (g)	1	Combustion tube + asbestos paper	64.00	2	Combustion tube + asbestos paper + lead oxide/yellow solid	117.52	3	Combustion tube + asbestos paper + lead/ grey solid	113.68	3
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<p>Able to complete the table less accurately that contain :</p> <ol style="list-style-type: none"> <li>3. Correct description</li> <li>4. Readings (4 decimal places)</li> </ol> <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th>Step</th> <th>Description</th> <th>Mass (g)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Combustion tube + asbestos paper</td> <td>64.0025</td> </tr> <tr> <td>2</td> <td>Combustion tube + asbestos paper + lead oxide/yellow solid</td> <td>117.5193</td> </tr> <tr> <td>3</td> <td>Combustion tube + asbestos paper + lead/ grey solid</td> <td>113.6768</td> </tr> </tbody> </table>	Step	Description	Mass (g)	1	Combustion tube + asbestos paper	64.0025	2	Combustion tube + asbestos paper + lead oxide/yellow solid	117.5193	3	Combustion tube + asbestos paper + lead/ grey solid	113.6768	2	
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Able to complete the table with at least one description / readings.	1													
No response given / wrong response	0													

Question	Rubric	Score															
1(c)	<p>Able to calculate the empirical formula of lead oxide correctly.</p> <p><u>Sample answer:</u></p> <table border="1"> <thead> <tr> <th>Element</th> <th>Pb</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>Mass (g)</td> <td>113.68-64.00 // 49.68</td> <td>117.52 – 113.68 // 3.84</td> </tr> <tr> <td>Number of moles (mol)</td> <td>49.68+207 // 0.24</td> <td>3.84 +16// 0.24</td> </tr> <tr> <td>Ratio of moles</td> <td>0.24/0.24// 1</td> <td>0.24/0.24// 1</td> </tr> <tr> <td colspan="3" style="text-align: center;">Empirical formula : PbO</td> </tr> </tbody> </table>	Element	Pb	O	Mass (g)	113.68-64.00 // 49.68	117.52 – 113.68 // 3.84	Number of moles (mol)	49.68+207 // 0.24	3.84 +16// 0.24	Ratio of moles	0.24/0.24// 1	0.24/0.24// 1	Empirical formula : PbO			3
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	Able to give an idea of calculating the empirical formula of lead oxide.	
	<u>Sample answer:</u> [Mass of Pb and O // number of moles of Pb and O]	1
	No response given / wrong response	0

Question	Rubric	Score
1(d)	Able to write the chemical equation correctly.	3
	<u>Sample answer:</u> $\text{PbO} + \text{H}_2 \rightarrow \text{Pb} + \text{H}_2\text{O}$	
	Able to write the chemical equation less correctly.	2
	<u>Sample answer:</u> $\text{PbO} + \text{H}_2 // \text{Pb} + \text{H}_2\text{O}$	
1(d)	Able to state an idea of writing chemical equation.	1
	<u>Sample answer:</u> Lead oxide + hydrogen $\rightarrow$ Lead + water	
	No response given / wrong response	0

Question	Rubric	Score			
1(e)	Able to classify of the all metal oxides correctly	3			
	<u>Sample answer :</u>				
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Method I</th> <th>Method II</th> </tr> </thead> <tbody> <tr> <td>Aluminium oxide Zinc oxide</td> <td>Copper(II) oxide Tin(IV) oxide</td> </tr> </tbody> </table>	Method I	Method II	Aluminium oxide Zinc oxide	Copper(II) oxide Tin(IV) oxide
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Able to classify three metal oxides correctly	2				
1(e)	Able to classify any two metal oxides correctly or give opposite answers.	1			
	<u>Sample answer:</u>				
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	No response or wrong response	0			

Question	Rubric	Score
2(a)	Able to state the three variables correctly	3
	<u>Sample answer:</u> Manipulated variable: Type of medium// Gel and water	
	Responding variable: Rate of diffusion	
	Constant variable: Potassium manganate (VII) // Temperature	
	Able to state any two variables correctly	
	Able to state any one variable correctly	2
	Able to state any one variable correctly	1
	No response given / wrong response	0

Question	Rubric	Score
2(b)	Able to give the hypothesis correctly	3
	<u>Sample answer :</u> In gel, rate of diffusion is lower than in water <i>or vice versa</i>	
	Able to give the hypothesis almost correct	2
	<u>Sample answer :</u> Rate of diffusion in gel is lower than in water // Different medium, different rate of diffusion	
	Able to state an idea of the hypothesis	1
<u>Sample answer :</u> Medium/ Substance affects the rate of reaction		
	No response or wrong response	0

Question	Rubric	Score
2(c)	Able to give the meaning of the diffusion correctly.	3
	<u>Sample answer:</u> The purple colour spreads when potassium manganate (VII) is put into water	
	Able to give the meaning of the diffusion less accurately.	2
	<u>Sample answer:</u> The purple colour formed when potassium manganate (VII) put into water	
	Able to give an idea of the diffusion.	1
<u>Sample answer:</u> Purple		
	No response or wrong response	0

Question	Rubric	Score
2(d)	Able to explain all the following aspects  1. Arrangement particles of solid 2. Arrangement particles of liquid 3. Movement of particles in medium  <u>Sample answer:</u>  (i) The particles of gel/solid are packed closely together (ii) The particles of water/ liquid are packed slightly loose (iii) (Manganate ion)/ Particles move faster into the spaces in between the water molecules // (Manganate ion)/ Particles move slower into the spaces in between the gel molecules	3
	Able to state any one of the aspects	2
	Able to give an idea  <u>Sample answer:</u> Arrangement of particles	1
	No response or wrong response	0

Question	Rubric	Score
2(e)	Able to predict the time taken correctly  <u>Sample answer:</u> Less / Shorter than one hour	3
	Able to predict the time taken less accurately  <u>Sample answer:</u> 30 minute < Time < 1 hour	2
	Able to state an idea of time taken  <u>Sample answer:</u> Time < 30 minute	1
	No response given / wrong response	0

Question	Rubric	Score
3(a)	Able to give the aim of the experiment correctly  <u>Sample answer :</u> To investigate the effect of the size/total surface area of calcium carbonate on the rate of reaction.	2
	Able to give the aim of the experiment incorrectly  <u>Sample answer :</u> To investigate the effect of the size/total surface area of reactant on the rate of reaction//.How does the size /the total surface area of a solid reactant affects the rate of reaction?	1
	No response given / wrong response	0

Question	Rubric	Score
3(b)	Able to state All variables correctly  <u>Sample answer :</u> Manipulated variable :Large and small granules of calcium carbonate // Size of calcium carbonate / reactant Responding variable : Rate of reaction Constant variable : Mass of calcium carbonate/Volume and concentration of HCl/acid	3
	Able to state any two variables correctly	2
	Able to state any one variables correctly	1
	No response or wrong response	0

Question	Rubric	Score
3(c)	Able to state the relationship between the manipulated variable and the responding variable correctly  <u>Sample answer :</u> When the size of calcium carbonate increases/decreased the rate of reaction decreases/increases//When the total surface area of calcium carbonate increases/decreases the rate of reaction increases/decreases	3
	Able to state the relationship between the manipulated variable and the responding variable incorrectly  <u>Sample answer :</u> The rate of reaction increases/decreases when the size of calcium carbonate decrease/increases	2
	Able to state an idea of the hypothesis  <u>Sample answer :</u> When the size of calcium carbonate/reactant changes the rate of reaction changes	1
	No response or wrong response	0

Question	Rubric	Score
3(d)	Able to give the list of the apparatus and materials correctly and completely  <u>Sample answer :</u> Materials: [0.2 -1.0] mol dm <sup>-3</sup> hydrochloric acid/any acid, small and large calcium carbonate, water,  Apparatus: [100 -250]cm <sup>3</sup> conical flask, basin/container, burette, delivery tube , retort stand with clamp, stop watch, measuring cylinder	3
	Able to give the list of the apparatus and materials correctly but not completely  <u>Sample answer :</u> Materials Hydrochloric acid/any acid, calcium carbonate, water,  Apparatus: Conical flask, basin/container, burette, delivery tube , stop watch, measuring cylinder	2
	Able to give an idea about the list of the apparatus and substances correctly  <u>Sample answer :</u> Materials: Hydrochloric acid/any acid, calcium carbonate, water, Apparatus: Conical flask, burette, delivery tube	1
	No response or wrong response	0

Question	Rubric	Score	
3(e)	<p>Able to state all procedures correctly</p> <p><u>Sample answer :</u></p> <ol style="list-style-type: none"> <li>1. Pour [20 – 50] cm<sup>3</sup> of dilute hydrochloric acid/any acid into a conical flask.</li> <li>2. Fill a burette with water and invert it over a basin/container of water. Record the initial reading of burette</li> <li>3. Add [0.5 – 2.0] g of small/powder calcium carbonate to the acid in the conical flask.</li> <li>4. Close the conical flask immediately with a stopper, at the same time start a stop watch.</li> <li>5. Record the burette reading every 30 seconds.</li> <li>6. Repeat steps 1 – 5 with large/granules of calcium carbonate.</li> </ol>	3	
	<p>Able to state 4 steps of procedures correctly / incompletely</p> <p>Steps 1,2,3,6</p>		2
	<p>Able to state any idea of procedure</p> <p>Steps 1,3</p>		1
	<p>No response or wrong response</p>		0



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3 (f)	<p>Able to exhibit the tabulation of data that includes the following information.</p> <ol style="list-style-type: none"> <li>Headings</li> <li>With unit</li> </ol> <p><u>Sample answer :</u> Using small calcium carbonate</p> <table border="1"> <tr> <td>Time/s</td> <td>0</td> <td>30</td> <td>60</td> <td>90</td> <td>120</td> </tr> <tr> <td>Burette reading/cm<sup>3</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Volume of carbon dioxide gas/cm<sup>3</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>Using large calcium carbonate</p> <table border="1"> <tr> <td>Time/s</td> <td>0</td> <td>30</td> <td>60</td> <td>90</td> <td>120</td> </tr> <tr> <td>Burette reading/cm<sup>3</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Volume of carbon dioxide gas/cm<sup>3</sup></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Time/s	0	30	60	90	120	Burette reading/cm <sup>3</sup>						Volume of carbon dioxide gas/cm <sup>3</sup>						Time/s	0	30	60	90	120	Burette reading/cm <sup>3</sup>						Volume of carbon dioxide gas/cm <sup>3</sup>						3
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